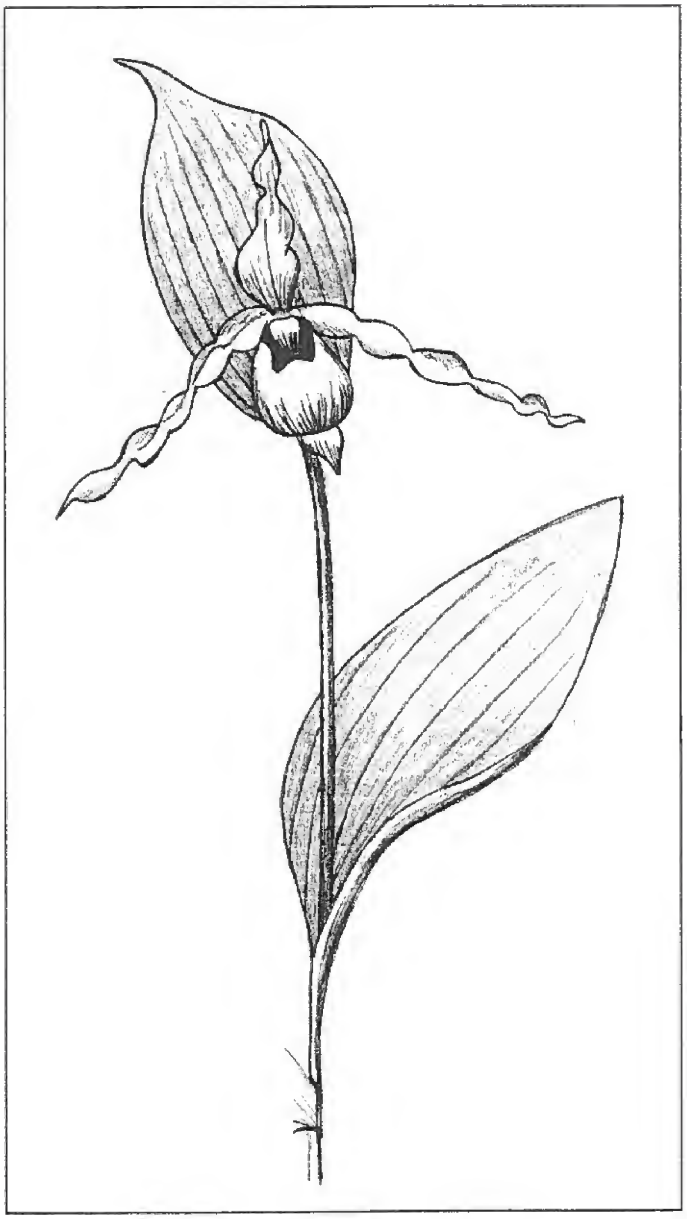
Castilleja

A Publication of the Wyoming Native Plant Society
www.uwyo.edu/wyndd/wnps/wnps_home.htm

October 2001
Volume 20, No. 3

In this issue:

WNPS News 2
2001 Summer Field Trips 2
The Flora of Ross Butte 4
Maps and Modeling 6
Botany Briefs
WNPS Photo Contest 7
Rare Plant Reports Available on Web 7
Computer Keys Available 8
In Quotes 8



Yellow lady-slipper (*Cypripedium calceolus* var. *pubescens*) is one of 3 lady-slipper orchids found native in the mountains of Wyoming. *Cypripediums* are characterized by their inflated, pouch-like lower lip petals that resemble a woman's slipper. The Yellow lady-slipper is the most widely distributed of the 3 species in Wyoming, being found sporadically in the Black Hills and Bighorn and Wind River ranges. All 3 are relatively uncommon and potentially highly threatened from over-collection for their beautiful flowers. Unfortunately, these orchids are nearly impossible to cultivate and are better appreciated in their wild setting. WNPS members were able to see the entire trifecta of *Cypripediums* on this year's field trips (see full story on pp 2-3). Illustration by Walter Fertig.

WNPS NEWS

2001 Annual Meeting: The Society's annual meeting and field trip was called to order by Secretary-Treasurer Fertig at ca 8:30 AM on June 23 on the picnic grounds of the Story Fish Hatchery. Approximately 25 members, guests, and canines were in attendance. Results of the 2001 WNPS elections were announced, with the following individuals sworn in to active duty: President: Joy Handley (Laramie), Vice-President: Nina Haas (Cheyenne), Secretary-Treasurer: Walter Fertig (Laramie), and Board Member: Claire Leon (Story). Outgoing Board members Amy Taylor and Steve Laster were thanked for their contributions during the past two years.

Meeting attendees voted on several potential sites for the 2002 annual meeting/field trip, and selected Heart Mountain and the eastern Absarokas as their first choice. Members requested a second field trip for the runner up site, the Wyoming Range. Look for details on these trips in a future newsletter.

In new business, Secretary-Treasurer/editor Fertig announced his impending nuptials with Laura Welp and his intentions to move to southern Utah in the Fall. Plans are currently being made to appoint a new acting secretary-treasurer. Stuart Markow and Bonnie Heidel of Laramie have agreed to help with newsletter production in the interim.

2002 Student Scholarship: The Society's annual scholarship is available for qualified undergraduate or graduate students studying any aspect of botany relating to native plants found in Wyoming. One to three scholarships will be awarded in the amount of $300-500. Interested students are encouraged to contact the Society Secretary or access the WNPS web site for an application form and more information on rules. Applications are due by 22 February 2002. Winners will be determined by the Board in March.

2002 Wyoming Plant Conservation Conference: The biennial Wyoming Plant Conservation Conference is set for March 19-21, in Laramie, WY at the Holiday Inn. "Sagebrush Steppe Biodiversity" sessions will be featured, in addition to open botany sessions, presentations on the flora and ecology of southeastern Wyoming, and the Species Status Review Workshop on Wyoming rare plant species.

New conference features are being considered including published proceedings, co-sponsorship by agency and academic partners, and a modest registration fee. Organizers include members of the Wyoming Rare Plant Technical Committee and Wyoming Native Plant Society. The next newsletter will have registration information. Conference information will also be posted at the WNPS homepage. If you have questions or suggestions, please contact: Jennifer Whipple (Jennifer_Whipple@nps.gov) or Bonnie Heidel (bheidel@uwyo.edu). BH

New Members: Please welcome the following new members of WNPS: Melanie Arnett (Laramie), Patricia Garlow (Sheridan), Edith Heyward (Sheridan), Scott Laursen (Laramie), Catherine Nagel (Pacific, MO), and Alan Redder (Laramie).

Treasurer's Report: Balance as of 16 October 2001: General Fund $1692.03; 2000-2001 Student Scholarship Fund $752.50; Total funds: $939.53.

Wyoming Native Plant Society
PO Box 3452, Laramie, WY 82071

President: Joy Handley (Laramie)
Vice President: Nina Haas (Cheyenne)
Secretary-Treasurer: Walter Fertig (Laramie)
Board Members: Claire Leon (Story)
Jim Ozenberger (Jackson)
Newsletter Editor: Walter Fertig
WNPS Webmaster: Rebekah Smith (Laramie)

Teton Chapter: PO Box 82, Wilson, WY 83014 (Joan Lucas, Treasurer).

Bighorn Native Plant Society: PO Box 21, Big Horn, WY 82833 (Jean Daly)

Contributors to this issue: Bruce Barnes (BB), Robert Dorn, Walter Fertig (WF), Bonnie Heidel (BH), Steve Laster, Stuart Markow (SM) and Isobel Nichols.

Field Trip Reports

Annual Meeting – Bighorn Range: Following our brief business meeting (discussed above), the group proceeded along the Piney Creek trail through the Story Fish Hatchery and onto Bighorn National Forest. Our route passed through a rich forest of Ponderosa pine with a dense shrubby understory of aspen, hawthorn, Rocky Mountain maple, spiraea, ninebark, and large bracken ferns. The group was lead by local resident and photographer Claire Leon, who pointed out many of her favorite species, including coral-roots, Canada violets, and wild geraniums. The goal of our hike, however, was to see the lady slipper orchids found sporadically along the trail. The Mountain lady-slipper (*Cypripedium montanum*) was the first to appear and was in full bloom. This leafy-stemmed species with wavy brown petals and an inflated, slipper-like white pouch was found at several sites along the trail, usually in shady spots. We continued on the trail hoping to find the Yellow lady-slipper (*C. calceolus* var. *pubescens*) which is

far less common along South Piney Creek, but otherwise more frequent in the Bighorns. An open area along the trail exposed deep red clay soils and an abundance of tall penstemons (*Penstemon glaber*) growing amid shiny-leaved Poison-ivy. Along the creek, we encountered large, pock-marked dolomite boulders with a variety of flowering plants in individual cups of thin soil. Among the species were the showy harebell, white-flowered daisies (*Erigeron ochroleucus*), deep-red James' saxifrage (*Boykinia heucheriformis*), and the rare Hapeman's sullivantia (a.k.a. *Sullivantia hapemanii* for those who dislike Latin). A tiny annual growing along the trail stumped the pros on the trip, although it was later identified as *Veronica verna*, a new exotic for the state that had been reported for the first time just a few years earlier from Sheridan County by Patsy Douglas. Finally after about a mile (something of a modern day endurance record for a WNPS annual trip) Claire found a single Yellow lady-slipper and waited patiently by the trail for the rest of the group to reach her. All were rewarded with ample photo opportunities and celebrated with a lavish feast of cold cut sandwiches and the like at the picnic grounds.

From Story, the group caravaned through Buffalo and onto the Bighorn National Forest. Our first stop was along Sourdough Creek off US Highway 16. This stream has the only known extant population of Northern blackberry or nagoonberry (*Rubus acaulis*) on the Bighorn NF. After a short hike, I found the first patch on the opposite bank of the creek in a hummocky willow thicket. The pink-flowered low shrubs were in full flower, although slightly past their peak. In the same thicket, I relocated a small patch of Lance-leaved moonwort (*Botrychium lanceolatum*) that I had discovered 2 years earlier while conducting a monitoring study of the blackberry. These diminutive ferns are difficult to see amid the rank growth of grasses and sedges, but after several minutes of hunting we found 3 or 4 tiny fronds.

Due to time constraints and impending rainy weather, we decided to proceed directly to the evening's camping destination at The Nature Conservancy's Ten Sleep Preserve. Following the lead of preserve manager Phil Shephard, we took the back way to the preserve via the Hazelton Road and were treated to beautiful vistas under interesting cloudy skies. Members reassembled at the Preserve's new lodge for a pot-luck supper and discussion of important social and scientific issues.

After a leisurely morning that included a short hike to photograph one of the Preserve's star attractions, the Cary's beardtongue (*Penstemon caryi*), the remaining troupe of botanists went on an expedition to see the extremely rare Hyattville milkvetch in the scenic red sandstones east of Hyattville. Unfortunately, the milkvetchs were not as abundant as in previous years and mostly past flowering, although a few had their characteristic inflated and speckled Easter egg-like pods. Also growing with the milkvetch was the white-flowered phase of Larch-leaved beardtongue (*Penstemon laricifolius*). By then it was noon and the group split up as members began their long drives home or continued exploring independently.

I remained in the Bighorns for a few more days of fieldwork before returning to Laramie and my summer school class. On Monday, I visited the French Creek Swamp north of Hunter Work Station and discovered a new population of Upward-lobed moonwort (*Botrychium ascendens*), a USFS Sensitive species that had not previously been reported from the Bighorn Range. Later in the day as I drove between Banner and Story I noticed an unusual yellow-flowered evening-primrose along the side of the highway. Upon closer inspection, the mystery plant turned out to be Large-fruited evening-primrose (*Oenothera macrocarpa* ssp. *macrocarpa*), a new record for the state. Growing with this plant was Woolly chickweed (*Cerastium tomentosum*), an escaped white-woolly perennial sub-shrub that turned out to be new to the state, Chick-pea milkvtech (*Astragalus cicer*) (a weed new to the county), and Portuguese daisy (*Chrysanthemum lacustre*), also new to the state that I recognized from my neighbor's yard. All told this site yielded 3 new state records (although, unfortunately, all are escaped exotics).
WF

Sierra Madre Trip: On a gray morning of 14 July, 6 members and one black, fuzzy dog convened on the Forest Service office in Encampment for a one-day tour of the Sierra Madre. Our first formal stop was at the Haskins Creek campground for a short hike in search of White trillium. Although the trillium remained elusive, we did locate a number of interesting montane and wetland flowers, including Fendlers cowbane (*Oxypolis fendleri)*, a tall, white-flowered umbel with once-pinnately compound leaves and a large, white-flowered vetch with an even bigger name: *Lathyrus lanszwertii* var. *leucanthus*. After lunch (and the requisite discussions of botanical and social import), we traveled a short distance to the base of Quartzite Peak to see some of the alpine plants found near its summit. Unfortunately, I took the wrong trail (in my defense I had not been to the site for at least 5 years) and we ended up on an old logging road. But luck was on our side as we discovered a new and extensive colony of the brownish-purple flowered Clustered ladys-slipper (*Cypripedium fasciculatum)* along the old two-track and in the adjacent Lodgepole pine and Engelmann spruce forests. Eventually we found our way and climbed up the lower slopes of Quartzite Peak, where we observed Low golden-aster (*Heterotheca pumila*) and Pinnate-leaved fleabane (*Erigeron pinnatisectus*), two regional endemics of the southern Rocky Mountains. One the way back down, we found a nesting nighthawk and were fooled by its broken wing display leading us from its nest. WF

The Flora of Ross Butte

By Walter Fertig

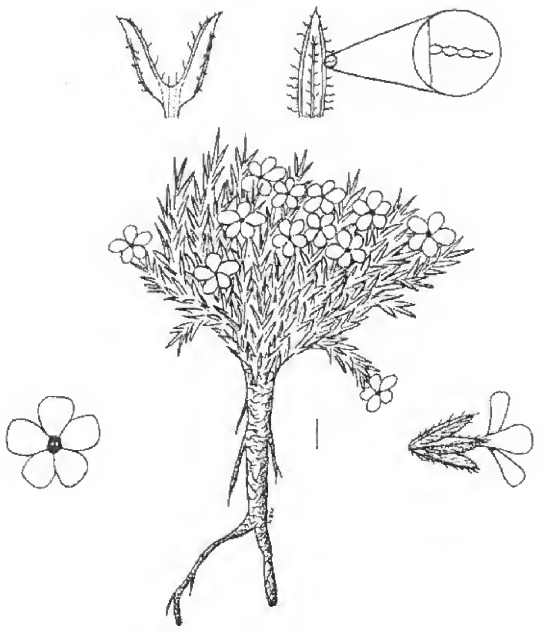
Wyoming Highway 351 is one of those roads built to save mankind's seemingly most precious commodity in the 21st Century: time. It cuts a nearly straight swath east-west across the northern end of the Green River Basin in Sublette County and helps speed motorists between US Highways 181 and 189 by skirting Pinedale. Trouble is most motorists want to go through Pinedale, either coming or going from Jackson and Yellowstone. As a result, WY Highway 351 doesn't see a lot of traffic.

It's a pity more people don't take this road, though, as it passes near one of the most interesting botanical areas in the state of Wyoming. Few motorists cruising to or from Big Piney may notice the pair of long mesas paralleling the south side of the highway below the junction of the New Fork and Green Rivers. Ross Butte and Ross Ridge (located just to the south) are subtle landscape features, rising gently above the surrounding plains of Wyoming big sagebrush. However, they harbor an unusually dense concentration of rare and endemic plant species as well as outstanding examples of cool desert vegetation types and winter big game habitat.

Ross Butte and Ross Ridge are the remnants of Eocene-age lake sediments that were deposited in an era when Wyoming resembled the Rift Valley of central Africa in climate, vegetation, and fauna. The mesas consist primarily of laminated grayish-brown marlstones, shales, and limey sandstones of the Green River Formation and support a mosaic of desert cushion plant and shrub communities that vary according to topographic position, moisture availability, and substrate. The foothills and adjoining basins contain mostly Wyoming big sagebrush or Gardner saltbush/ Rubber rabbitbrush vegetation on rolling sandy-clay flats of the Wasatch Formation. Dry washes incised into the lower slopes of the mesas may contain patches of Greasewood, Wyoming big sagebrush, and Thickspike wheatgrass, while small benches with fine-grained clays may support Bud sagewort communities.

The upper slopes of Ross Butte and Ross Ridge support a variety of shrub communities, with Black sagebrush dominating rocky sites with poor soil development and Wyoming big sagebrush, Mountain snowberry, True mountain mahogany, and Rubber rabbitbrush occupying concave slopes of fine clay and sandstone. Some of these shrub stands can become especially dense and provide outstanding winter habitat for mule deer. Small patches of Limber pine also occur on sheltered north slopes of Ross Ridge. Drier slopes may be devoid of vegetation or have only sparse stands of saltbush and rabbitbrush.

The wind-blasted rims of Ross Butte and Ross Ridge support cushion plant communities and semi-barren grasslands of Sandberg bluegrass and Thickspike wheatgrass. Slightly sheltered depressions are dominated by Beaver Rim phlox, Big Piney milkvetch, Hooker sandwort, Larch-leaved penstemon, and Thickspike wheatgrass. On adjacent, convex rims, the phlox and wheatgrass are replaced by dense colonies of Stemless goldenweed, Cushion buckwheat, and Sandberg bluegrass. Away from the rims, deeper soils support Wyoming big sagebrush grasslands reminiscent of the valley floor.



Above: *Phlox pungens* by Isobel Nichols from the *Wyoming Rare Plant Field Guide.*

The Ross Butte ecosystem provides habitat for only about 150 vascular plant species, a comparatively low number relative to most areas of comparable size in the state. What the mesas lack in richness, however, they more than make up for in terms of rare or uncommon species. Over a dozen local or regional endemics are found in the area, accounting for nearly 10% of the total flora.

One of the most widespread of the local endemics is the Big Piney milkvetch (*Astragalus drabelliformis*), a densely matted member of the Pea family (Fabaceae). This species, originally dubbed the "Bastard draba milkvetch" by its discoverer, Rupert Barneby, is restricted to the upper Green River Basin and was renamed in honor of the Queen City of Sublette County in the 1990s in a nod to political correctness. *Astragalus drabelliformis* is characterized by its 3-sided fruits that have a characteristic dimple at maturity. Otherwise it closely resembles the ubiquitous Spoonleaf milkvetch (*Astragalus spatulatus*), one of the state's most common pea species. Big Piney milkvetch was once a candidate for potential listing under the Endangered Species Act, but surveys in the early to mid 1990s by Ron Hartman,

Above: *Astragalus drabelliformis* by Walter Fertig and Steve Laster (from *Wyoming Rare Plant Field Guide*).

Ernie Nelson, Tom Cramer, Ron Kass, and Steve Laster found the plant to be far more numerous in the basin than previously suspected. The purple-flowered plant occurs frequently on semi-barren patches of stony soils on the rims, slopes, and flats of Ross Butte and Ross Ridge.

A common associate of the milkvetch is the Beaver Rim phlox (*Phlox pungens*), a slightly prickly, matted herb with large white flowers. This species has only been known to science since 1988 (it was first named by Robert Dorn). Populations on Ross Butte and other mesas in the Little Colorado Desert of western Sublette County differ from typical plants in the Beaver Rim area of Fremont County in having short-stalked glandular hairs on the leaves and narrower leaf blades. Nearly twenty medium to large colonies of Beaver Rim phlox are found in the Ross Butte area on gray to reddish brown clay-shale slopes with a surface of white limey sandstone.

A second narrowly endemic phlox, the Opal phlox (*Phlox opalensis*), is also found on Ross Butte, but is restricted mostly to gullies and washes of fine clay at the base of mesas amid communities of Greasewood, Gardner saltbush, and Wyoming big sagebrush. The Opal phlox resembles the more common Hood's phlox, but has a less compacted growth form with longer internodes and larger, fragrant flowers. Opal phlox was first discovered at Ross Butte by University of Wyoming graduate student Tom Cramer in 1995 during his floristic survey of the Green River Basin. The entire global range of the species is limited to the Green River Basin in southwestern Wyoming and extreme northeastern Utah (near Manila), but the plant is locally abundant and numbers in the millions of individuals.

Much less common is the Large-fruited bladderpod (*Lesquerella macrocarpa*), another narrow endemic restricted to clay badlands in the Great Divide and Green River basins in southwest Wyoming. At Ross Butte this species occurs on barren clay knolls and steep, unvegetated badland slopes. Populations of Large-fruited bladderpod fluctuate widely each year in response to moisture levels and seedling recruitment. In good years, it may be quite abundant and contribute a high amount of cover, while in poor years one can search the same area for hours and barely find a half dozen individuals. Some members of the genus *Lesquerella* possess chemicals in their seeds and fruits with properties similar to those of castor oil. Scientists with the USDA are currently investigating a variety of native *Lesquerella* species to develop a new, domestic oil-seed crop with potential commercial value. *L. macrocarpa* has attracted interest because of its large fruit size and ability to grow in arid climates.

One of the showiest plants of the barren clay soils of Ross Butte is the Glandular phacelia (*Phacelia glandulosa*). This annual or biennial herb has pinnately lobed leaves and an elongate, coiled inflorescence of numerous, strong-scented, purple, bell-shaped flowers fringed with long-exserted stamens. Populations at Ross Butte and some other mesas in southwest Wyoming have an equal mix of sticky glandular hairs and gray, smooth hairs and may represent a distinct variety (var. *deserta*). Unfortunately, the distinctive nature of the hairs is often lost once a specimen is dried and preserved, making identification of this variety difficult. *P. glandulosa* may co-occur with a tiny, annual relative, *Phacelia salina*, which differs in having unbranched, ground-hugging stems, entire leaves, and tiny yellow flowers. *P. salina* is a rare desert ephemeral that is often only obvious during years of adequate spring moisture.

At present, the Ross Butte ecosystem receives very little use other than low levels of cattle grazing (although a rough two-track road leads to the summit of Ross Butte to service a small radio tower). The same is not true for the surrounding basins and mesas in the upper Green River Basin, which are currently experiencing a major boom in natural gas development. Although the likelihood of a gas strike at Ross Butte is low, new mineral exploration could occur and with it a proliferation of 4-wheel drive roads. Under current management by the BLM Pinedale Field Office, the Ross Butte area is closed to vehicle use during the winter months to minimize impacts to the resident mule deer herd. No formal regulations exist to protect the native vegetation or flora.

Sometimes such a lack of attention is not necessarily a bad thing, as many fragile desert sites can become "loved to death" after they are discovered by the public. In the case of Ross Butte, however, additional attention from botanists and nature lovers may be just what the area needs. If nothing else, the interesting flora of Ross Butte can help break up the monotony of driving on Wyoming Highway 351.

Mapping and Modeling the Distribution of Plants

By Walter Fertig

Maps provide a powerful visual tool for depicting information, such as the distribution of animal and plant species. Traditional range maps illustrate species distributions using points (dot maps), irregular polygons (outline maps), or combinations of both. Dot maps show documented locations, but may represent only a fraction of a species actual range or reflect sampling bias. Outline maps show broader areas of potential habitat based on dot distributions and the mapper's knowledge of the local environment. The assumptions of the mapper are rarely stated (and thus difficult to test), and such maps may overestimate the actual range of a species at coarser scales.

The development of Geographic Information Systems (GIS) has revolutionized the art and science of range mapping. GIS, in conjunction with large environmental datasets and computerized statistical methods, allows models of species/habitat interactions to be incorporated into the mapping process. Model-based range maps can be superior to traditional ones because the assumptions of the map are explicit and readily testable with new data.

The following examples depict different ways of illustrating the potential range of a Wyoming plant, Low stickleaf (*Mentzelia pumila*). Based on information from herbarium collections, the range of this plant in the state can be shown with a simple dot map (Figure 1). This map indicates that Low stickleaf is found mostly in the basins of central and western Wyoming, but offers little information for prediction of new locations.

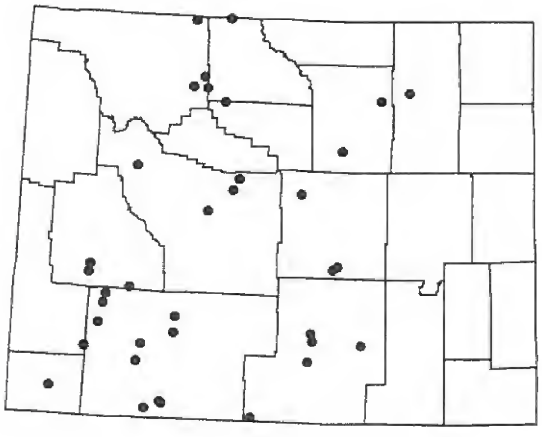


Figure 1. Dot distribution map of Low stickleaf in Wyoming based on specimens from the Rocky Mountain Herbarium.

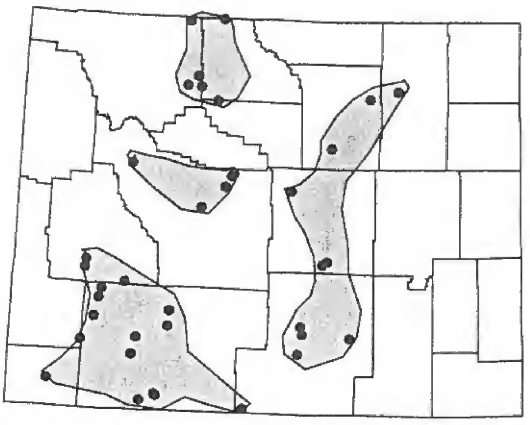


Figure 2. Predicted distribution map of Low stickleaf in Wyoming by "connecting the dots".

An outline map (Figure 2) can be derived from the previous map by connecting the dots to form polygons of likely habitat based on the knowledge of the mapper. The probability of this species being present or absent within the polygon, however, has not been tested in the construction of the map.

Figure 3 depicts potential habitat for Low stickleaf based on a statistical analysis using a Classification Tree model. The model used presence/absence as the response variable and terrain position, bedrock geology, July mean temperature, and January, April, and July mean precipitation as predictor variables. A map of potential range was produced by intersecting areas of the state with selected values for these environmental predictors. The model correctly classified 89% of the known present and absent locations in the model-building dataset and 56.3-85% of the known points in an independent validation dataset. This model will be field-

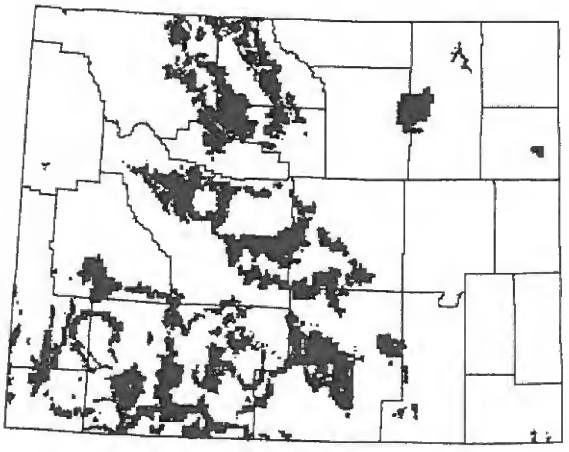


Figure 3. Predicted distribution of Low stickleaf in Wyoming based on correlational modeling in GIS.

tested in the future to determine its success with new information and will likely be subjected to further refinement.

Models can be used by land managers and researchers to identify areas of potential habitat for surveys of sensitive species and to assess the probability that a given species may be present in an area being considered for development. They can also be a valuable tool for setting time and funding priorities for such research.

Maps and models are abstractions of nature, but are still an integral part of the scientific process. All maps and models rest on simple assumptions and fail to take into account every potential variable, and thus are wrong from the start. The goal of mapping and modeling, just as in any scientific hypothesis, is to identify possible causal mechanisms or relationships. Like any hypothesis, maps and models are a best guess given the available information and assumptions and must be rigorously tested. Finding the flaws with a map or model allows the modeler to incorporate new data or modify basic assumptions and produce a continually better product. Only through testing and re-testing, can progress in maps, models, and science be achieved.

Botany Briefs

"Now listen up Pilgrim 'cause I'm only gonna tell ya this once!"

Announcing the First Annual Wyoming Native Plant Society Photo Contest: The WNPS will be sponsoring a photo contest featuring pictures of ... guess what: Wyoming native plants. Entries may be single plants, populations, or even landscapes. In fact, almost anything goes as long as the pictures "focus" on native plants. Contest opens January 1st, 2002 and closes March 31st. Photos will be judged on content, clarity, creativity, and originality, and the winning shot will be displayed in the May issue of *Castilleja*.

Questions commonly asked about the WNPS photo contest:

Who can enter? Answer: You can.

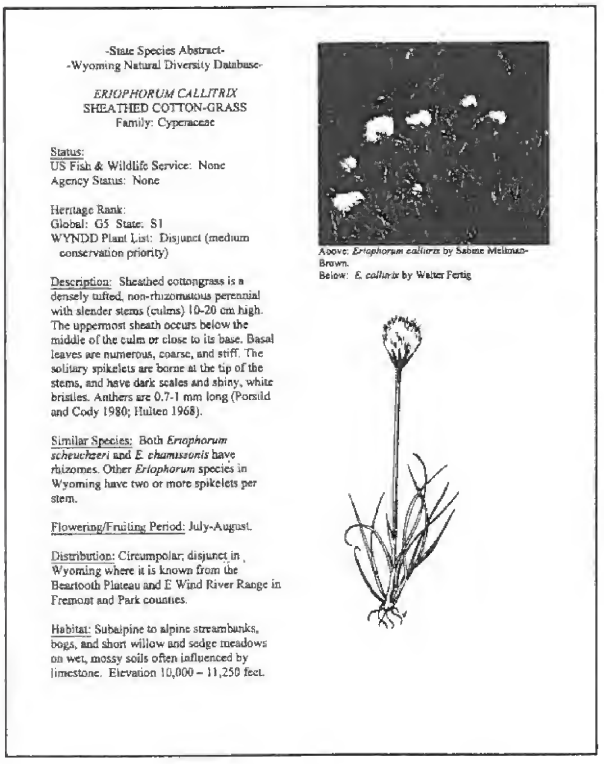
How can I enter? Answer: Send those pictures (slides or prints) to:

Wyoming Native Plant Society
P. O. Box 3452
Laramie, Wyoming 82071

Why bother? Answer: Prize is $25.00 plus a free 1-year subscription to *Castilleja*.

Will my picture (s) be returned? Answer: Yes, if you include a stamped, self-addressed envelope. SM

Rare Plant Reports Available on the Web: The Wyoming Natural Diversity Database (Wyoming's state natural heritage program) is in the process of writing and posting short natural history "biographies" of each of the state's rare plant species on the internet. These reports (see sample below) contain non-technical information on the identification, status, habitat, distribution, abundance, threats, trends, and protection status of each species, as well as state range maps, color photographs, and drawings when available. The reports also contain a detailed bibliography of additional references. The reports are housed on the Diversity Database's home page (www.uwyo.edu/wyndd) along with a digital version of the "Wyoming Plant and Animal Species of Special Concern" list.



-State Species Abstract-
-Wyoming Natural Diversity Database-

ERIOPHORUM CALLITRIX
SHEATHED COTTON-GRASS
Family: Cyperaceae

Status:
US Fish & Wildlife Service: None
Agency Status: None

Heritage Rank:
Global: G5 State: S1
WYNDD Plant List: Disjunct (medium conservation priority)

Description: Sheathed cottongrass is a densely tufted, non-rhizomatous perennial with slender stems (culms) 10-20 cm high. The uppermost sheath occurs below the middle of the culm or close to its base. Basal leaves are numerous, coarse, and stiff. The solitary spikelets are borne at the tip of the stems, and have dark scales and shiny, white bristles. Anthers are 0.7-1 mm long (Porsild and Cody 1980; Hulten 1968).

Similar Species: Both *Eriophorum scheuchzeri* and *E. chamissonis* have rhizomes. Other *Eriophorum* species in Wyoming have two or more spikelets per stem.

Flowering/Fruiting Period: July-August.

Distribution: Circumpolar; disjunct in Wyoming where it is known from the Beartooth Plateau and E Wind River Range in Fremont and Park counties.

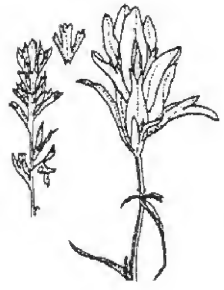
Habitat: Subalpine to alpine streambanks, bogs, and short willow and sedge meadows on wet, mossy soils often influenced by limestone. Elevation 10,000 – 11,250 feet.

Above: *Eriophorum callitrix* by Sabine Meilman-Brown.
Below: *E. callitrix* by Walter Fertig

Illustrated Keys Now Available: The interactive keys for computer produced by Flora ID Northwest are now available with color images for virtually all species. Many folks from around the northwest deserve thanks for allowing their slides to be copied to make this possible. Coincidentally, the Windows software the keys run in has been completely rewritten, resulting in keys that are much easier to use. The prices have been lowered, so that keys for an entire state are $100, or $300 for the entire northwest. Keys are available ("statewide" only) for southern British Columbia, Washington, Oregon, Idaho, Montana, Wyoming, Utah, and Colorado. The distributor is The New York Botanical Garden Press, 200th Street and Kazimiroff Blvd, Bronx, NY 10458-5126, 718-817-8842, or nybgpress@nybg.org. BB

In Quotes By Robert Dorn

Lt. Col. W. F. Raynolds, U. S. Army
Carex raynoldsii
Report ... on the Exploration of the Yellowstone.... 40th Congr., 1st [2nd] Sess., Senate Exec. Doc. No. 77:79. 1868.
May 15, 1860
"The country traversed to-day is the same barren desert that we have been in since leaving the Platte - very little grass, no wood, and scarcely any water. I cannot conceive how it will ever be made inhabitable for the white man, and the whole country from the Big Horn mountains to the Platte is of this same character."



Wyoming Native Plant Society
PO Box 3452
Laramie, WY 82071

The Wyoming Native Plant Society, established in 1981, is a non-profit organization dedicated to encouraging the appreciation and conservation of the native flora and plant communities of Wyoming. The Society promotes education and research on native plants of the state through its newsletter, field trips, and annual student scholarship award. Membership is open to individuals, families, or organizations with an interest in Wyoming's flora. Members receive *Castilleja*, the Society's quarterly newsletter, and may take part in all of the Society's programs and projects, including the annual meeting/field trip held each summer. Dues are $7.50 annually.

To join the Wyoming Native Plant Society, return the membership form below to:

Wyoming Native Plant Society
PO Box 3452
Laramie, WY 82071

Name: _____

Address: _____

___ $7.50 Regular Membership
___ $15.00 Scholarship Supporting Member
($7.50 goes to the annual scholarship fund)